BUILDING MATERIALS AND CONSTRUCTION
(CIVL 2103)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) The raw bricks shrink during drying and warp during burning because of
(a) less lime in brick earth
(b) less silica and excess magnesia in brick earth
(c) excess of alumina and silica in brick earth
(d) alkalis in brick earth.

(ii) If L is the length and B is the width of the brick and t the thickness of mortar, the relation between these is
(a) $L = 2B$ (b) $L = B + t$
(c) $L = B + 2t$ (d) $L = 2B + t$.

(iii) For marine works, the best suited cement is
(a) Low heat Portland cement (b) Rapid hardening cement
(c) Ordinary Portland cement (d) Blast furnace slag cement.

(iv) Which of the following aggregates gives maximum strength in concrete
(a) rounded aggregates (b) elongated aggregates
(c) flaky aggregates (d) cubical aggregates.

(v) The rate of heat of hydration for the four Bogue's compound in descending order is as follows:-
(a) $C_3A > C_2S > C_3A > C_4AF$ (b) $C_3S > C_3A > C_2S > C_4AF$
(c) $C_4AF > C_3A > C_2S > C_3S$ (d) $C_4AF > C_3S > C_3A > C_2S$.

(vi) Plaster of Paris $CaSO_4.(0.5)H_2O$ contains about
(a) 3% of water (b) 6% of water
(c) 8% of water (d) 11% of water.

(vii) The ultimate tensile strength of mild steel (in N/mm^2) is:-
(a) 140 (b) 400 (c) 600 (d) 1000.

(viii) For bridges, the appropriate foundation is:
(a) pile foundation (b) pier foundation
(c) well foundation (d) spread footing.

(ix) The apex line of the sloping roof is called:
(a) ridge (b) eaves
(c) verge (d) purlins.

(x) Gypsum has
(a) high bulk density (b) negligible shrinkage
(c) damp proofing property (d) low creep.

Group – B

2. (a) Explain the reasons behind the following phenomena.
(i) Formation of bloating
(ii) Formation of chuffs
(iii) Formation of checks or cracks
(iv) Formation of black core and broken blisters.

(b) Write only the percentage of all the chemical compositions present in clay-burnt bricks.

(c) Explain the following terms as far as lime is concerned:
(i) Calcination and hydraulicity
(ii) Quick lime
(iii) Slaked lime
(iv) Slaking

(5 × 1) + 2 + (2 + 1 + 1 + 1) = 12

3. (a) What do you mean by flakiness index and elongation index for aggregates? Explain in brief any five properties of aggregates.

(b) Compare fat lime and hydraulic lime on the basis of:
(i) composition
(ii) slaking action
(iii) setting action.

(c) What is Alkali-Aggregate Reaction (AAR)?

(2 + 5) + 3 + 2 = 12

Group – C

4. (a) What are the common impurities of Pig iron? Write short note on properties of cast iron.

(b) In short explain the classification of timber based on any three of the following:
   (i) Position
   (ii) Grading
   (iii) Durability
   (iv) Availability
   (v) Seasoning Characteristics.

(c) Write short notes on:
   (i) Bulking of sand.
   (ii) Classification of mortar.

(2 + 3) + 3 + 4 = 12

5. (a) State the differences between mild steel, wrought iron, cast iron and cast steel.

(b) What are the precautions to be taken while making the use of mortar?

6 + 6 = 12

Group – D

6. (a) Discuss various functions served by foundations.

(b) Describe different types of spread footings with neat sketches.

4 + 8 = 12

7. (a) Write down the characteristics of a good partition wall. Write short note on stretcher and queen-closer.

(b) Draw plans of alternate courses of 1.5 brick thick wall in English bond.

(4 + 2) + 6 = 12

Group – E

8. (a) Write down the objects of plastering.

(b) Write a short note on dog-legged stair. Plan a dog legged stair for a building in which the vertical distance between the floors is 3.9 m. The stair hall measures 3 m × 5 m.

3 + (3 + 6) = 12

9. (a) Describe with the help of a neat sketch the different parts of a King-post truss.

(b) Write down the required characteristics of a floor to perform its functions properly.

8 + 4 = 12